

# ***Recommendations Related to Reporting of Healthcare-Associated Infection Measures***

*Excerpt from Prevention and Control of Healthcare Associated Infection in Massachusetts, Part 1:  
Final Recommendations of the Expert Panel, January 31, 2008.*

The final report containing all of the Panel's findings can be found at  
[www.mass.gov/dph/betsylehman/index.htm](http://www.mass.gov/dph/betsylehman/index.htm).

## Recommendations Concerning Reporting of Healthcare Associated Infections

The following section of this report details the twelve specific recommendations in the area of HAI reporting made by the Massachusetts HAI Expert Panel for the consideration by the Lehman Center and the Department of Public Health.

The selection of measures for HAI reporting was guided by the recommendations of the Healthcare Infection Control Practices Advisory Committee<sup>4</sup> who emphasized the importance of considering frequency, severity and preventability of HAIs along with the ability to detect and report them accurately. The types of infections that best fulfill these criteria are bloodstream infections (BSI) and surgical site infections (SSI). Ventilator-associated pneumonia (VAP) was also considered, but urinary tract infections (UTI) were not since HICPAC has determined there is “less prevention effectiveness relative to the burden of data collection and reporting” of UTIs<sup>4</sup>.

Thus far, most public information on hospital performance used to monitor quality of care is based solely on *process measures* (actions taken by healthcare providers that improve care and reduce risk of complications). However, there is also interest in monitoring the results of these processes through *outcome measures* such as rates of specific infections. The Task Groups and Expert Panel considered both types of measures in their deliberations.

Early in the deliberations, the Expert Panel identified three potential levels of reporting for HAI-related process and outcome measures:

- To the public for use by consumers, insurers and all stakeholders
- To the Betsy Lehman Center for monitoring and quality improvement purposes, but not for public dissemination
- Within the institution only, for tracking performance and results of quality improvement activities

Some HAI measures raise serious concerns about difficulties with standardization across hospitals, which could lead to false reassurance, unfounded fears, and other unintended consequences. For this reason, the second level (Betsy Lehman Center without public distribution) was chosen as a reasonable compromise in selected instances, since it provides an opportunity to study the results with input from experts and appropriate stakeholders. In situations in which inter-hospital methods and definitions vary widely or evidence supporting the validity of the measure is lacking, internal tracking within the hospital for self-assessment was determined to be the limit of utility.

## A. GENERAL CONCEPTS CONCERNING REPORTING OF HAI RELATED MEASURES<sup>h</sup>

### Recommendation 1

#### **Guidelines for Selection of Measures for Public Reporting of HAI-related measures**

1. The measures used for reporting of specific healthcare-associated infections, as well as the process measures used to prevent such infections, should be based on objective definitions that can be consistently applied by all Massachusetts hospitals that are subject to the reporting requirements. **A-IV**
2. Outcome measures used for reporting (e.g. rates of specific healthcare-associated infections) should be developed to allow for an appropriate level of risk adjustment in relation to factors such as patient population and severity of illness. **B-IV**

### Recommendation 2<sup>1-6</sup>

#### **Guiding Principles for a public reporting system for HAI from the perspective of hospital infection prevention and control programs**

##### ***Common Goals of Public Reporting and Infection Control Programs***

*The primary goal of hospital infection prevention and control programs is to protect patients, employees and visitors from transmission of infection. The stated rationales for mandatory public reporting of HAIs are to inform the public as they make their health care choices, and to improve health care quality by reducing HAI rates. As mandated public reporting is put in place, it is critically important to design a reporting system that can function synergistically with hospital infection control and performance improvement programs, to work toward their common goals of reducing HAIs and improving patient safety.*

1. The reporting system should collect and report healthcare data that are useful not only to the public, but also to the facility (hospital) for its infection control and prevention efforts. **B-IV**
2. Hospitals should use the reporting data to provide feedback to their health care providers about the facility's performance, to provide additional information to guide the hospital's ongoing efforts to prevent HAI, with the added opportunity to compare the facility's data with others in the health care system. **B-IV**

---

<sup>h</sup> The definitions used in this reporting system are definitions for surveillance only and are not to be used as tools for diagnosis or treatment.

### ***Resource Allocation for Reporting***

*Anticipating the likely establishment of mandatory public reporting of HAIs in the near future, directors of hospital infection prevention and control programs are concerned about the additional resources that will be necessary to collect, analyze, and report the required data. It is essential that the demands of data collection and submission for public reporting do not undermine the core functions and activities of infection prevention and control programs by diverting time and resources from them. It is also important to recognize that hospitals in Massachusetts vary widely in the levels of personnel and non-personnel resources (such as IT infrastructure) devoted to infection control as identified in the Survey of Infection Control Programs and Practices in Massachusetts Hospitals.*

*As stated in Joint Public Policy Committee's Essentials of Public Reporting: A Tool Kit: "Each institution must assess the scope of its infection control program to ensure that adequate resources are available for any additional surveillance activities needed to meet the legislative mandates of public reporting. In today's healthcare environment, in addition to their traditional roles, infection control professionals (ICPs) have expanded obligations in various aspects of health care delivery that include, but are not limited to, construction and renovation activities, employee and occupational health, bioterrorism and pandemic influenza preparation, disaster planning and outpatient services. Therefore, additional personnel and resources must offset any further burden placed on ICPs by public reporting."*

- 3.** To avoid duplication of efforts, data collection requirements of the public reporting system (with regard to measures selected, definitions, populations surveyed and surveillance criteria), should, to the extent possible, be consistent with the recommendations and requirements of national organizations and agencies, for example, CDC, CMS, and the Joint Commission. **A-IV**
- 4.** Reporting requirements should be phased in gradually to enable hospitals to modify their surveillance activities as needed, ensure reliability of data to be reported, and assess needs for additional resources. **B-IV**
- 5.** Requirements for public reporting of HAIs should take into consideration the likely costs to hospitals, and the risk that public reporting may divert resources from infection prevention to data collection unless compensatory resources are made available. **B-IV**

*With increasing numbers of process and outcome indicators being monitored for quality improvement, public health, regulatory and accreditation purposes, the volume of patient care data to be collected, analyzed and displayed continues to increase. The availability of automated databases and information technology (IT) support is pivotal to valid and timely measurement and reporting of health care indicators. Results of the*

*Survey of Infection Control Programs and Practices in Massachusetts Hospitals indicate that hospitals in Massachusetts vary widely in their IT capacity for infection control.*

- 6.** Requirements for public reporting of HAIs should take into consideration the need for increased investment in appropriate information technology and information services support in hospitals to facilitate the data collection and analysis required. **A-IV**
- 7.** The Massachusetts Department of Public Health should provide or facilitate initial and ongoing training for hospital staff in the data collection and data submission processes required by the public reporting system. **B-IV**

### ***ICP Oversight of Data Collection for Public Reporting***

*The Healthcare Infection Control Practices Advisory Committee (HICPAC) guidelines on public reporting of HAI recommend that states “use established public health surveillance methods when designing and implementing mandatory HAI reporting systems.” HAI surveillance requires trained, professional personnel to collect, validate, analyze, and interpret the data. In addition, as it is likely that the public reporting system may require the submission of certain measures that may, in many hospitals, be collected by entities other than infection control e.g., quality improvement or employee health, increased communication and coordination among these entities may be necessary. A multidisciplinary advisory group composed of infection control experts and representatives of other key stakeholders will help to ensure the smooth and effective functioning of the reporting system, once established, and the quality and utility of its products/reports.*

- 8.** Data collection for public reporting of HAIs should be overseen by individuals with training in infection control and prevention, as defined by the Healthcare Infection Control Practices Advisory Committee (HICPAC). **A-IV**
- 9.** Hospitals should facilitate collaboration and cooperation between their departments of infection control, quality improvement, employee health, and others involved in the prevention and control of HAIs, to ensure that the data required by the reporting system are collected efficiently, and used effectively, by the institution to improve quality of care. **A-IV**
- 10.** The Department of Public Health should appoint an Advisory Committee, to meet regularly, composed of, but not limited to, the Department's director of infectious disease, a representative of the Betsy Lehman Center, infection control professionals, hospital administrators, hospital epidemiologists, quality improvement professionals, health care providers, consumers, and technical experts (e.g., microbiologist, statistician). The purpose of the Advisory Committee would be to advise the Department on the ongoing implementation of the reporting system, and

to assist the Department in the promulgation and review of regulations regarding the surveillance, reporting, and prevention of HAIs. **A-IV**

### ***Assessment of Reporting Impacts***

*Mandatory public reporting of HAI may have both positive and negative effects on hospital infection control programs. Potential beneficial effects of public reporting on hospital infection prevention and control programs include increased institutional focus on infection control, facilitation of enhanced collaboration between infection control and quality improvement programs, expansion of IT infrastructure for infection control, and increased allocation of resources to infection control. Potential detrimental effects include the diversion of resources from prevention of infections, additional strain on overloaded hospital infection control programs, and creation of incentives to underreport infections. As yet, there is little published information on the role or effectiveness of public reporting in reducing HAIs.*

**11.** The effects of public reporting of HAIs should be periodically assessed. A plan for such assessment should be built into the public reporting system from the outset. **A-IV**

### **Recommendation 3**<sup>7-12</sup>

#### **Statement on the Use of Administrative Data for Public Reporting of HAIs**

*Several states have used administrative claims data to provide the public with comparative data on selected healthcare outcomes. While these data are easily accessible, inexpensive, and comprehensive across a large population, numerous studies have challenged their validity and accuracy for use in identifying clinical events such as HAIs.*

Use of administrative data (such as hospital discharge diagnostic codes) alone for public reporting of healthcare-associated infections leads to substantial misclassification and should not be adopted. **A-II**

## B. RECOMMENDATIONS CONCERNING PUBLIC REPORTING OF HAI-RELATED MEASURES

### ***Recommendation 4***<sup>13-19</sup>

#### **Public Reporting of Central Venous Catheter –Associated Bloodstream Infection (CVC-BSI) Rates in Intensive Care Units<sup>i</sup>**

*Outcome measures for public reporting should be selected based on frequency, severity, preventability, and ability to detect and report accurately and consistently across hospitals. CVC-BSIs are the second leading cause of HAI-related mortality in U.S. hospitals (after ventilator-associated pneumonia) and are therefore recommended as a reportable measure by expert authorities. Furthermore, 89% of Massachusetts hospitals currently track CVC-BSI rates in ICUs. For these reasons:*

- 1. Facilities designated by the Massachusetts Department of Public Health (MDPH) as **Acute Care Hospitals** should be mandated to track and report **laboratory-confirmed CVC-BSI rates in ICUs** to MDPH. **A-IV****

*Intensive care unit patients are at a greater risk of acquiring HAIs due to the number of procedures and seriousness of comorbidities.*

- 2. ICUs should be defined as **All Intensive Care Units**. These include: medical ICUs (MICU), surgical ICUs (SICU), combined medical/surgical ICUs, neonatal ICUs (NICU), pediatric ICUs (PICU), coronary care units (CCU), neuro/neurosurgery ICUs (NSICU) cardiac surgery ICUs (CSICU), trauma ICUs, and burn ICUs. **A-II****

*Expert authorities and various studies have acknowledged the challenge of diagnosing laboratory-confirmed bloodstream infections in a standardized manner. This is largely due to the subjectivity in classifying cultures that are positive for bacteria commonly considered part of the skin flora. In order to guarantee standardization of rates for inter-hospital comparison, the following is recommended:*

- 3. Reporting to MDPH should be restricted to BSIs that:**
  - a. Meet the current National Healthcare Safety Network (NHSN) criterion 1 for Laboratory-Confirmed Bloodstream Infection (LCBI). (Attachment C) and**
  - b. A central or umbilical catheter was in place at the time of or within 48 hours before the onset of LCBI. **A-II****

---

<sup>i</sup> Note: The definitions used in this reporting system are definitions for surveillance only and are not to be used as tools for diagnosis or treatment.

Both HICPAC<sup>4</sup> and the Joint Commission<sup>70</sup> recommend the use of catheter (or device) days as a denominator for calculating BSI rates to adjust for potential differences in risk factors. Although labor intensive, most (78%) of Massachusetts hospitals currently use catheter-days for BSI rate calculation.

- 4. Rates will be calculated based on central venous catheter days. Calculation equation A-II:**

$$\text{CVC-BSI rate} = \frac{\text{\# of CVC-BSIs}}{\text{Total Catheter-days}} \times 1,000$$

**5. Definitions:**

- a) Central Venous Catheters – should be based on the most current NHSN definition (Attachment C). **A-IV**
  - b) Catheter-days – total number of days of exposure to the central venous catheter by all of the patients in the observed ICU. This could be obtained through a daily count or through use of a once-weekly sampling method (Attachment C).<sup>30</sup> **A-IV**
- 6. Numerator** – the number of CVC-BSI diagnosed in an intensive care unit patient while a central venous catheter is in place or within 48 hours after the CV catheter was discontinued. CVC-BSIs that develop within 48 hours of patient transfer out of the ICU are also included (Attachment C). **A-IV**
- 7. Denominator** – sum of catheter-days (as defined above) of all patients in the specific ICU. A patient with more than one (1) CV catheter on a given day is counted only once for that day. **A-IV**

*For inter-hospital comparisons, healthcare-associated infection rates must account for dissimilarities in underlying conditions and severity of illness between patients. The risk of acquiring a bloodstream infection varies across hospitals and across types of intensive care units.*

**8. Stratification**

- a) By type of ICU. **A-IV**
  - b) By hospital type (teaching versus non-teaching). **A-IV**
  - c) By hospital size (using appropriate bed size categories). **A-IV**
- 9. Data Collection/Reporting Periods:**
- a) Hospitals should submit data at least quarterly or according to NHSN requirements. **A-IV**
  - b) Reports should be released to the public every **six (6) months**. **B-IV**

**Recommendation 5** <sup>20-25</sup>

**Public Reporting of Surgical Site Infections for Total Hip and Total Knee Arthroplasties**

*Outcome measures for public reporting should be selected based on frequency, severity, preventability, and ability to detect and report accurately and consistently across hospitals. Surgical site infections (SSI) are the second most frequent HAI in U.S. hospitals (after UTIs). They are associated with significant morbidity and considerably extend the length of hospitalization. Expert authorities have identified SSI as a high priority outcome measure for public reporting.*

*In order to assure comparability of rates across hospitals, collection of standardized data for specific, high-volume operations is recommended. The definition of SSIs for hip and knee arthroplasties are highly uniform across facilities and in Massachusetts, over 95% of hospitals perform these procedures. In addition, process measures for these two procedures are monitored as part of the Surgical Care Improvement Project (SCIP).*

*For these reasons:*

- 1.** Facilities designated by the Massachusetts Department of Public Health (MDPH) as **Acute Care Hospitals** should be mandated to track and report to MDPH rates of surgical site infections<sup>j</sup> resulting from the following operative procedures (see Attachment D): **B-IV**
  - a) Total Hip Replacements B-IV**
  - b) Total Knee Replacements B-IV**

*Deep incisional and organ/space SSI cause the greatest morbidity and mortality. Superficial site infections are less likely to result in death or injury and their identification is difficult to standardize across hospitals. Furthermore, superficial site infections are more likely and are often diagnosed and treated in the ambulatory setting where access to data is variable.*

- 2.** Reporting to MDPH will be restricted to **deep incisional and organ/space SSI** (Attachment D). **B-IV**
- 3.** Rates will be calculated as follows: **A-IV**

$$\text{SSI rate} = \frac{\text{Number of SSI}}{\text{Number of surgeries}} \times 100$$

<sup>j</sup> Reported SSI rates will not be surgeon-specific

*Both HICPAC<sup>4</sup> and the Healthcare-Associated Infection Working Group of the Joint Public Policy Committee<sup>2</sup> emphasize the importance of standardization of definitions and the use of established methods for collecting/reporting surveillance data.*

- 4. Definitions:** Surgical Site Infection subtype definitions should be based on the most current NHSN definition. (Attachment D). **A-IV**
- 5. Numerator:** The number of SSIs related to the specified operative procedure. Cases shall be assigned to the numerator based on the month of surgery. **B-IV**
- 6. Denominator:** The number of the selected operative procedures performed in the reporting month. **A-IV**

*To enable comparability between hospitals, rates must be stratified according to patients' risk of developing SSI. The NNIS risk index is a well-established and recommended method of risk adjusting rates for inter-hospital comparison. Although some studies have offered methods of risk adjustment that consider independent risk factors for each procedure individually and achieve high predictive values, these methods are not well-established and require computerized input of data from operating rooms. Expert authorities have recommended the use of the NNIS risk index as the optimal method of risk stratification at this time.*

- 7. Risk Adjustment** should be performed using the National Nosocomial Infection Surveillance (NNIS) risk index. **A-II**

*Studies have shown that over half of SSIs do not become evident until after hospital discharge. Expert authorities have recommended postdischarge surveillance for SSIs to account for these infections. However, there is a great deal of variability among institutions with regard to methods of postdischarge surveillance of SSIs. The literature also indicates that certain methods (physician or patient surveys) are highly inconsistent. Therefore, in order to ensure comparability across hospitals:*

- 8. Post Discharge Surveillance** should be conducted by review of readmission data to identify potential SSIs occurring within 30 days after a procedure not involving an implant or within one year if implant is in place and the infection appears related to the operative procedure. **The numerator must only include SSIs identified during readmission, to any hospital** (hospitals must report infections to the operating hospital as per Joint Commission recommendations). **B-II**

## C. RECOMMENDATIONS CONCERNING REPORTING OF HAI-RELATED MEASURES TO THE BETSY LEHMAN CENTER<sup>k</sup>

### **Recommendation 6**<sup>26-33</sup>

#### **Reporting of Central Venous Catheter Bloodstream Infection (CVC-BSI) Rates<sup>l</sup>**

*While common skin contaminants are recognized as a major cause of CVC-BSI, no standardized definitions exist that allow for accurate inter-hospital comparisons of rates of CVC-BSI caused by these organisms. For the purpose of better understanding the role of common skin contaminants in CVC-BSI and the validity of relevant reporting definitions for CVC-BSI, the following is recommended:*

Hospitals should report rates for all CVC-BSI occurring in **all intensive care units that:**

- a.** Fulfill current criteria 2 or 3 of the NHSN surveillance definition for laboratory confirmed bloodstream infection (LCBI) (Attachment C).
- and b.** A central or umbilical catheter was in place at the time of or within 48 hours before the onset of LCBI to the Betsy Lehman Center or its designee. **B-II**

*These data should be reviewed by a Betsy Lehman Center-appointed advisory committee for use in quality improvement, trend analysis, research, and the evaluation of possible phase-in for public reporting.*

- a) The (at least) two positive blood cultures must be obtained within **two days** of each other. **B-II**
- b) The (at least) two positive blood cultures must share an identical **antibiogram** (per NHSN definition). **B-II**
- c) **Catheter-days** should be used as the denominator for calculating all CVC-BSI rates noted above. **A-II**
- d) Catheter-days may be determined through use of a **once-weekly sampling method** (Attachment C).<sup>30</sup> **A-II**
- e) Data reported to the Betsy Lehman Center **shall not be released publicly.** **A-IV**

<sup>k</sup> For Betsy Lehman Center reporting, hospital-specific rates must remain confidential.

<sup>l</sup> For additional detail, please refer to Recommendation 4: Public Reporting of Central Venous Catheter –Associated Bloodstream Infection (CVC-BSI) Rates in Intensive Care Units.

**Recommendation 7** <sup>20-25</sup>

**Reporting of Surgical Site Infections for Total Hysterectomies and Coronary Artery Bypass Grafts**

*Outcome measures for public reporting should be selected based on frequency, severity, preventability, and ability to detect and report accurately and consistently across hospitals. Although SSIs resulting from certain surgeries are frequent and severe, their definitions are difficult to standardize across hospitals. This makes them unsuitable for public reporting at this time. The importance of these SSIs, however, merits collection of data by a central agency for possible future implementation as a publicly reported measure.*

1. Facilities designated by the Massachusetts Department of Public Health (MDPH) as Acute Care Hospitals should be mandated to track and report to the Betsy Lehman Center or its designee rates of surgical site infections<sup>m</sup> resulting from the following operative procedures (see Attachment D) **B-IV**:
  - a) **Total Abdominal Hysterectomies B-IV**
  - b) **Total Vaginal Hysterectomies B-IV**
  - c) **Coronary Artery Bypass Grafts (CABGs) B-IV**

*Deep incisional and organ/space SSI cause the greatest morbidity and mortality. Superficial site infections, in contrast, are less likely to result in death or injury and their identification is difficult to standardize across hospitals. Furthermore, superficial site infections are more likely to be diagnosed and treated in the ambulatory setting where access to data is variable.*

2. Reporting to the Betsy Lehman Center or its designee should be restricted to **deep incisional and organ/space SSI** (Attachment D). **B-IV**
3. Rates are calculated as follows: **B-IV**  
$$\text{SSI rate} = \frac{\text{Number of SSI}}{\text{Number of surgeries}} \times 100$$

*Both HICPAC<sup>4</sup> and the Healthcare-Associated Infection Working Group of the Joint Public Policy Committee<sup>2</sup> emphasize the importance of standardization of definitions and the use of established methods for collecting/reporting surveillance data.*

4. **Definitions:** Surgical Site Infection subtype definitions should be based on the most current NHSN definition. (Attachment D). **B-IV**

<sup>m</sup> Reported SSI rates will not be surgeon-specific

- 5. Numerator:** The number of SSIs related to the specified operative procedure. Rates should be calculated separately for deep incisional and organ/space SSIs. Cases shall be assigned to the numerator based on the month of surgery. **B-IV**
- 6. Denominator:** The number of the selected operative procedures performed in the reporting month. **B-IV**

*To enable comparability between hospitals, rates must be stratified according to patients' risk of developing SSI. The NNIS risk index is a well-established and recommended method of risk adjusting rates for inter-hospital comparison. Although some studies have offered methods of risk adjustment that consider independent risk factors for each procedure individually and achieve high predictive values, these methods are not well-established and require computerized input of data from operating rooms. Expert authorities have recommended the use of the NNIS risk index as the optimal method of risk stratification at this time.*

- 7. Risk Adjustment** should be performed using the National Nosocomial Infection Surveillance (NNIS) risk index. **B-II**

*Studies have shown that over half of SSIs do not become evident until after hospital discharge. Expert authorities have recommended postdischarge surveillance for SSIs to account for these infections. There is, however, a great deal of variability among institutions with regard to methods of postdischarge surveillance of SSIs. The literature also indicates that certain methods (physician or patient surveys) are highly inconsistent. Therefore, in order to ensure comparability across hospitals:*

- 8. Post Discharge Surveillance** should be conducted by review of readmission data to identify potential SSIs occurring within 30 days after a procedure not involving an implant or within one year if implant is in place and the infection appears related to the operative procedure. **The numerator must only include SSIs identified during readmission, to any hospital** (hospitals must report infections to the operating hospital as per Joint Commission recommendations). **B-II**
- 9.** Data shall be reported to the Lehman Center or its designee for a period of **one year (pilot year)**. **B-IV**

**10.** Data collected during the pilot year should be **reviewed by a Betsy Lehman Center-appointed advisory committee**. Based on these data, the committee should decide whether to recommend public reporting for the above measures. **B-IV**

**Recommendation 8** <sup>34-38</sup>

**Reporting of Ventilator-Associated Pneumonia Process Measures**

Pending rigorous definition and a feasibility evaluation, the Panel **recommends** that the following measures be reported at least annually to the Betsy Lehman Center (for internal use but not public disclosure): **B-II**

- a) **The daily application of protocol-driven assessments for readiness to discontinue mechanical ventilation**
- b) **Elevation of the head of the patient's bed**

In addition, we recommend reporting of the time and resources required to collect these measures.

**Creation of Adequately Explicit Measures and Reporting Standards:** Because public reporting of VAP process measures is a new undertaking with possible adverse consequences, the Panel recommends that a group be convened to create adequately explicit measurement standards and techniques for meaningful intra- and inter- hospital comparisons. This group should consider intermittent, rather than continuous, measurement schemes; these may provide similarly actionable data with fewer required resources. The reporting standards and measurement schemes should be studied and subject to public comment prior to broad implementation. **B-IV**

**Ongoing Assessment of Measures:** A group should be formed to evaluate the data collected by the Lehman Center, to assess the burden of data collection, and to make future recommendations about additional reporting. Measure selection should be re-visited on an annual basis or more frequently. **B-IV**

**Other possible measures:** For possible future measure selection, the Panel believes the weight of present evidence about possible VAP prevention process measures falls into four categories: **B-IV**

- a) Improvements in the reliability of the following processes are likely to be associated with a reduction in the rate of ventilator-associated pneumonia: **B-IV**
  - The daily application of protocol-driven assessments for readiness to discontinue mechanical ventilation

- Elevation of the head of the patient's bed
  - Daily lightening of sedation in appropriate patients
  - Frequent oral care
  - The use of oral antiseptics
- b) At this time, the published evidence is insufficient to support a bundle methodology to reduce the rate of ventilator-associated pneumonia, although such a set of measures may well be shown to be effective in the future. **B-IV**
- c) The evidence argues that prophylaxis against deep venous thrombosis has no relationship to ventilator-associated pneumonia. **B-IV**
- d) The evidence argues that provision of prophylaxis against stress ulceration can increase the risk of nosocomial infection. In particular, proton pump inhibitors might increase the risk of *Clostridium difficile*-related infections and have been associated with an increased risk of community-acquired pneumonia. Although stress ulcer prophylaxis is likely to be important for other reasons in the critically ill, and overall benefits may outweigh risks, it cannot be recommended as a method to reduce ventilator-associated pneumonia. **B-IV**

#### **Recommendation 9** <sup>39-44</sup>

##### **MRSA Prevalence Survey in Massachusetts Acute Care Facilities**

*Methicillin resistant Staph aureus (MRSA) is the most common multidrug-resistant organism causing HAIs<sup>39</sup>. There is no general consensus on how to optimally prevent HAI MRSA, although significant efforts to develop effective approaches to control infection and transmission of MRSA are currently underway. Therefore it is likely that recommendations will change over the next few years.*

*A facility's MRSA burden is a combination of community-acquired MRSA brought into the facility and hospital-acquired MRSA, and includes patients with active infection and those with asymptomatic colonization. A general consensus among experts in the field is that the determination of the overall burden of MRSA is especially important when trying to decide which prevention or control method should be implemented; however no consensus exists on a uniform approach. Methods for determining the overall burden of MRSA include: 1) surveillance of clinical cultures 2) active culturing of all patients at a single point in time (point prevalence) 3)*

*actively culturing all patients on an ongoing basis (active surveillance program). According to the survey on infection control and prevention programs in Massachusetts conducted in February 2007, 97% of respondents were engaged in surveillance of microbiology results for new cases of MRSA, and 50% were doing surveillance cultures on selected patients at admission.*

*After extensive review of current literature and discussion, the expert panel concluded that the optimal approach at this time is to implement a point prevalence study to be performed in all acute care hospitals in Massachusetts on a bi-annual basis. Point prevalence surveys represent valuable tools that hospitals can use to estimate their overall MRSA burden. This information can then be used by hospitals to shape their individual strategy for MRSA prevention, efforts which may include a range of interventions including hospital-wide or special risk group active surveillance. The decision regarding approaches to MRSA surveillance and prevention should also include consideration of the risks of MRSA transmission to patients<sup>40</sup>, the potential benefits of active surveillance in decreasing the risk, and the resources required for active surveillance compared with other infection control program activities.*

*There remains considerable controversy around the benefit of active surveillance for all hospitals as the relative benefit of an active surveillance program vs. the risk and cost has not been established. Expert opinion is divided, but there is some consensus that the decisions and approach towards including active surveillance in the infection control program needs to be individualized for each hospital. In addition, experts have stressed that the implementation of an active surveillance program is resource-intensive and careful planning needs to be done before such a program is put into place. Other hospital departments besides the infection control department need to be involved in the creation of an active surveillance program including the microbiology laboratory, nursing, medical staff, environmental services, and hospital administration.<sup>41,42</sup> Therefore the Expert panel concurred that hospital-wide active surveillance in all acute care hospitals should not be recommended at this time.*

All acute care hospitals in Massachusetts will conduct a MRSA prevalence survey to identify the number of inpatients infected or colonized with MRSA (similar to the recent national prevalence study of MRSA conducted by the Association for Professionals in Infection Control and
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Epidemiology [APIC]). Facilities will complete the survey for one day during the second quarter of 2008. Existing microbiology, medical, and infection control records will be used to identify patients; additional patient culturing will be needed only in ICUs as noted below. The DPH HAI Technical Advisory Committee will determine the specific survey protocol in accordance with the methods, definitions and tools used by APIC in their 2006 national survey.

To complement and enhance the APIC MRSA prevalence survey approach, the following additional step should be added. On the day of the survey, hospitals should obtain MRSA nasal cultures on all ICU patients at their facility including patients who have had a history of MRSA colonization. Patients in the ICUs that are actively being treated for documented MRSA do not require a nasal surveillance culture for purposes of this survey. ICUs are defined as all intensive care units, including but not limited to medical ICUs (MICU), surgical ICUs (SICU), combined medical/surgical ICUs, neonatal ICUs (NICU), pediatric ICUs (PICU), coronary care units (CCU), neurosurgery ICUs (NSICU), cardiac ICUs (CSICU), trauma ICUs and burn ICUs.

The recommended technique for screening is as follows:

Both anterior nares should be cultured using a single sterile standard swab. The swab should be rotated in each nares two to five times clockwise and counterclockwise. The process should gently rub across the mucous membranes about three-fourths of an inch into the nasal passage (adult) so that squamous epithelial cells from inside the nose are obtained. Isolation of MRSA should be on mannitol salt agar or comparable media, such as CHROMagar or PCR.

Interpretation of the results will be directed by the MDPH HAI Technical Advisory Committee. Point prevalence for the ICUs conducting MRSA screening is calculated as the number of patients infected or colonized with MRSA divided by the total number of patients cultured plus those who were not cultured due to active MRSA infection. Acute care facilities with multiple ICUs should do separate point prevalence calculations for each hospital unit.

It is expected that facilities will use these prevalence estimates to guide MRSA prevention activities as recommended by the most current CDC Management of Multidrug-Resistant Organisms in Healthcare Settings Guidelines.

Hospitals will submit their prevalence survey data to the Betsy Lehman Center or its designee, for interpretation by the HAI Technical Advisory Committee. Appropriate feedback to individual hospitals will be determined, but no public release of hospital-specific information should occur at

this time. All opportunities for meaningful use of the data to inform prevention activities will be explored by the technical advisors. The results of these point prevalence surveys can also help inform MDPH's statewide control efforts however the results should not be used for inter-hospital comparisons. Institution-level findings should be interpreted with caution by the MDPH and its HAI Technical Advisory Committee in light of sample size and other limitations. With direction from its technical advisors, MDPH should repeat the MRSA prevalence survey in Massachusetts acute care facilities on a bi-annual basis. **A-IV**

**Recommendation 10**<sup>45-57</sup>

**Reporting of Influenza Vaccination Rates of Health Care Personnel**

*As stated by CDC in its 2006 recommendations for influenza vaccination of healthcare personnel (HCP)<sup>45</sup>, a substantial body of evidence shows that “vaccination of health care personnel reduces transmission of influenza in healthcare settings, staff illness and absenteeism, and influenza-related morbidity and mortality among persons at increased risk for severe influenza illness”. CDC and expert groups including APIC<sup>46</sup>, SHEA<sup>47</sup> and the National Foundation for Infectious Diseases (NFID)<sup>48</sup> recommend annual influenza vaccination for HCP, and, in addition, advocate institutional monitoring of HCP influenza vaccination rates, for the purposes of performance feedback to providers and administrators, and evaluation of the impact of in-house vaccination programs.*

*The influenza vaccination rate of health care personnel has been suggested as one process measure (a measure of adherence to recommended health care practices) that can be used as an indicator of the quality of a hospital's patient safety programs. Both HICPAC<sup>49</sup> and SHEA<sup>50</sup> have put it forward it as a potential process measure for public reporting.*

*In 2007<sup>51</sup>, Joint Commission standards were revised to require hospitals to establish/enhance employee influenza vaccination programs and to monitor influenza vaccination rates of their staff. Thus Joint Commission-accredited hospitals will be tracking HCP vaccination rates. However, there will likely be variability in how hospitals define and collect data for the numerator and denominator of this rate, and at this point in time, vaccination rates may not be comparable across hospitals. For a process measure to be publicly reported, it is essential that it be defined and measured in such a way as to be reasonably comparable across institutions. For this reason, the Expert Panel has recommended that hospitals initially report their HCP influenza vaccination rates to the Betsy Lehman Center only, not for public release, so that measurement methods can be reconciled and a standard, comparable approach agreed*

upon. NHSN is currently planning to add an HCP influenza vaccination module to its system (pending OMB approval), and this may provide a sanctioned, standard method that hospitals can use to measure the influenza vaccination rates of their health care personnel.

1. Facilities designated by the Massachusetts Department of Public Health (MDPH) as Acute Care Hospitals are mandated to track and report influenza vaccination rates of health care personnel to the Betsy Lehman Center, for a pilot period of at least one year. This pilot period will be used to assess the reliability of the rate as defined, and the comparability of the rate across hospitals. Revisions to numerator and denominator definitions will be made as necessary based on experience. **B-IV**

2. Once the method for calculating the influenza vaccination rate of health care personnel is determined to be valid and comparable across hospitals, MDPH with its HAI Technical Advisory Group should consider making the hospital-specific rates publicly reportable. **C-IV**

3. Rates will be calculated as follows: (prevalence)

$$\frac{\begin{array}{l} \text{\# HCP who received current season's} \\ \text{flu vaccine by March 30} \end{array}}{\begin{array}{l} \text{\# HCP working in the hospital as of} \\ \text{March 30} \end{array}} \times 100 = \% \text{ of eligible HCP vaccinated} \quad \textbf{B-IV}$$

Definitions:

4. Numerator – Health care personnel (HCP) who have received the current season's influenza vaccination. Vaccination may have been received either at the hospital where the individual works or at an outside location. **B-IV**

5. Denominator – Health care personnel (HCP) working at the hospital as of the date specified in the numerator. In line with CDC guidelines, HCP are defined as all persons working in health-care settings who have the potential for exposure to infectious materials, including body substances, contaminated medical supplies and equipment, contaminated environmental surfaces, or contaminated air. HCP might include (but are not limited to) physicians, nurses, nursing assistants, therapists, technicians, emergency medical service personnel, dental personnel, pharmacists, laboratory personnel, autopsy personnel, students and trainees, contractual staff not employed by the health-care facility, and persons (e.g., clerical, dietary, housekeeping, maintenance, and volunteers) not directly involved in patient care but potentially exposed to infectious agents that can be transmitted to and from HCP. **B-IV**

6. In the event of a vaccine shortage, the numerator and the denominator definitions will be restricted to those categories of health care personnel (HCP) prioritized by MDPH as eligible for vaccine during the period of vaccine shortage. **B-IV**

Data Collection Methods:

**7.** Hospitals will conduct an annual survey of health care personnel to find out how many individuals have received the current season's influenza vaccine. ***B-IV***

Data Collection/ Reporting Periods:

**8.** Hospitals are to submit data to the Betsy Lehman Center on an annual basis, within 90 days after March 30. ***B-IV***

**9.** At periodic intervals during the influenza season, hospitals should monitor internally the influenza vaccination rates of their HCP, to assess vaccination coverage within their facility, and take steps to improve it. ***B-IV***

## D. RECOMMENDATIONS CONCERNING INTERNAL TRACKING/REPORTING OF HAI-RELATED MEASURES

### **Recommendation 11**<sup>58-65</sup>

#### **Internal, Non-Public Reporting of Central Venous Catheter Bloodstream Infection (CVC-BSI) Rates**

*Although all CVC-BSI occurring within hospitals are of clinical importance, public reporting of hospital-wide CVC-BSI rates is not recommended at this time. However, in addition to publicly reporting NHSN criterion 1 CVC-BSI from ICUs, acute care hospitals must track and report CVC-BSI rates in the following manner:*

Recommend that hospitals **internally** track all CVC-BSIs occurring on all inpatient units that fulfill criteria 1 or 2 or 3<sup>n</sup> of the NHSN surveillance definition (Attachment C) to use for internal quality improvement efforts. **B-IV**

- a) Catheter-days are preferred as the denominator for calculating CVC-BSI rates. If catheter-days are not available, patient-days may be used. **B-II**
- b) Catheter-days may be determined through use of a once-weekly sampling method (see Attachment C). **B-II**

### **Recommendation 12**<sup>66-69</sup>

#### **Internal Surveillance of Ventilator-Associated Pneumonia**

*Benchmarking the quality of care for ventilated patients is laudable in principle but challenging in practice. Clinical diagnosis, CDC surveillance criteria, and quantitative cultures of lower pulmonary tract specimens all suffer from limited accuracy and reproducibility. These limitations make perceived VAP rates difficult to interpret and potentially misleading regardless of which definition is used. This is especially true when trying to compare different institutions that can reasonably apply each of these definitions in different ways.*

In the absence of a rigorous gold standard to measure VAP, the Panel recommends against requiring hospitals to report VAP rates. Individual institutions should conduct internal VAP surveillance using an internally consistent technique in order to assess the impact of care measures adopted to improve the quality of care for ventilated patients. **A-II**

---

<sup>n</sup> Criterion 3 (patients below 12 months of age) has been referred to the Pediatric Affinity Group for further consideration

### **Recommendation 13**

#### **Use of the National Healthcare Safety Network (NHSN) System**

Participation of Massachusetts acute care hospitals in the National Healthcare Safety Network (NHSN) will provide an accessible and efficient vehicle for public reporting of healthcare-associated infections. The measures selected to date for hospital-level data release (CVC-BSI and SSI) can be managed appropriately through NHSN without adding substantial costs or implementation delays. Potential for flexibility of the data elements captured, consistency with other measures under consideration and potential for comparison to national data also have positive bearing on the choice of NHSN. The Task Group supports the use of NHSN as the initial HAI reporting framework. **A-IV**

### **Recommendation 14**<sup>71</sup>

#### **Internal Surveillance of *Clostridium difficile*-associated disease (CDAD)**

Because standardized case and surveillance definitions for *Clostridium difficile*-associated disease (CDAD) have just been made available, the MRSA/Other MDRO Task Group does not recommend rates of CDAD be reported publicly or to the Betsy Lehman Center at this time.

Individual institutions should continue to conduct internal CDAD surveillance using an internally consistent definition. The *Clostridium difficile* case and surveillance definitions proposed by McDonald et al should be reevaluated once data on their use are available. In addition, several new national guidelines from IDSA, SHEA and CDC will be published in 2008 and these guidelines should be consulted for their recommendations regarding the detection of *Clostridium difficile*-associated disease. **B-IV**

### **Recommendation 15**

#### **Electronic collection of laboratory data on Multiple-Drug Resistant Organisms (MDROs) by the Massachusetts Department of Public Health**

*During the last twenty years there has been increasing recognition of infections due to multi-drug resistant organisms. Of particular concern is a growing incidence of methicillin-resistant Staphylococcus aureus (MRSA) both in the healthcare and community settings. While the original MRSA strains were limited only to hospital settings, in the late 1990's a new MRSA strain emerged in community settings.*

*Although sophisticated laboratory testing can distinguish between healthcare and community MRSA strains, at this time such testing is beyond the capabilities of most clinical laboratories.*

At this time both technical concerns as well as biological changes in this bacterial pathogen prevent scientifically rational public reporting of MRSA rates on an institutional level. For the purposes of future monitoring and evaluation, the MRSA and other MDRO Task Group support MDPH's efforts to develop and implement methods to electronically collect laboratory data on certain MDROs including invasive MRSA isolates, VRE and *Staph aureus* annual antibiograms. In order for these data to be useful for future monitoring and evaluation of rates, the data collection and reporting system must be standardized using national guidelines across all acute care hospitals in Massachusetts. **B-IV**

*For a summary of selected reporting measures refer to Attachment E.*

Editorial note on reporting of catheter-associated urinary tract infections (CAUTI):

Given that urinary tract infections are the most common HAI and that most are associated with having a bladder catheter, some have assumed that these infections would be logical choices for public reporting. However, most patients with CAUTI have no symptoms and morbidity is limited. Furthermore, the standard CDC definition for symptomatic urinary tract infection can be difficult to apply to patients with indwelling catheters, leading HICPAC <sup>5</sup> to exclude CAUTI from its list of recommended HAI measures. They noted that “monitoring these infections likely has less prevention effectiveness relative to the burden of data collection and reporting”. The forthcoming IDSA/SHEA guidelines are in agreement with HICPAC in not proposing mandatory reporting of this outcome. In the future, the potential utility of reporting process measures related to CAUTI will be considered.

## ATTACHMENT C

### **Definition of Laboratory-confirmed bloodstream infection (LCBSI)<sup>o</sup>**

LCBSI criteria 1 and 2 may be used for patients of any age, including patients  $\leq 1$  year of age.  
LCBSI must meet one of the following three criteria:

#### **Criterion 1:**

Patient has a recognized pathogen cultured from one or more blood cultures

and

organism cultured from blood is not related to an infection at another site. (See Notes 1 and 2 below.)

#### **Criterion 2:**

Patient has at least one of the following signs or symptoms: fever ( $>38^{\circ}\text{C}$ ), chills, or hypotension

and

signs and symptoms and positive laboratory results are not related to an infection at another site

and

common skin contaminant (i.e., diphtheroids [*Corynebacterium* spp.], *Bacillus* [not *B. anthracis*] spp., *Propionibacterium* spp., coagulase-negative staphylococci [including *S. epidermidis*], viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp.) is cultured from two or more blood cultures drawn on separate occasions. (See Notes 3 and 4 below)

#### **Criterion 3:**

Patient  $\leq 1$  year of age has at least one of the following signs or symptoms: fever ( $>38^{\circ}\text{C}$ , rectal), hypothermia ( $<37^{\circ}\text{C}$ , rectal), apnea, or bradycardia

and

signs and symptoms and positive laboratory results are not related to an infection at another site

and

common skin contaminant (i.e., diphtheroids [*Corynebacterium* spp.], *Bacillus* [not *B. anthracis*] spp., *Propionibacterium* spp., coagulase-negative staphylococci [including *S. epidermidis*], viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp.) is cultured from two or more blood cultures drawn on separate occasions. (See Notes 3, 4 and 5 below)

#### **Notes:**

1. In criterion 1, the phrase “one or more blood cultures” means that at least one bottle from a blood draw is reported by the laboratory as having grown organisms (i.e., is a positive blood culture).
2. In criterion 1, the term “recognized pathogen” does not include organisms considered common skin contaminants (see criteria 2 and 3 for a list of common skin contaminants). A few of the recognized pathogens are *S. aureus*, *Enterococcus* spp., *E. coli*, *Pseudomonas* spp., *Klebsiella* spp., *Candida* spp., etc.
3. In criteria 2 and 3, the phrase “two or more blood cultures drawn on separate occasions” means 1) that blood from at least two blood draws were collected within two days of each other (e.g., blood draws on Monday and Tuesday or Monday and Wednesday would be acceptable for blood cultures drawn on separate occasions, but blood draws on Monday and Thursday would be too far apart in time to meet this criterion), and 2) that at least one bottle from each blood draw is reported by the

---

<sup>o</sup> Source: NHSN Patient Safety Reporting Protocol, 2008. The NHSN definition for Laboratory-confirmed bloodstream infection (LCBSI) has been revised effective January 1, 2008. Voting and recommendations related to LCBSI are consistent with NHSN changes.

laboratory as having grown the same common skin contaminant organism (i.e., is a positive blood culture). (See Note 4 for determining sameness of organisms.)

- a. For example, an adult patient has blood drawn at 8 a.m. and again at 8:15 a.m. of the same day. Blood from each blood draw is inoculated into two bottles and incubated (four bottles total). If one bottle from each blood draw set is positive for coagulase-negative staphylococci, this part of the criterion is met.
  - b. For example, a neonate has blood drawn for culture on Tuesday and again on Saturday and both grow the same common skin contaminant. Because the time between these blood cultures exceeds the two-day period for blood draws stipulated in criteria 2 and 3, this part of the criteria is not met.
  - c. A blood culture may consist of a single bottle for a pediatric blood draw due to volume constraints. Therefore, to meet this part of the criterion, each bottle from two or more draws would have to be culture-positive for the same skin contaminant.
4. There are several issues to consider when determining sameness of organisms.
- a. If the common skin contaminant is identified to the species level from one culture, and a companion culture is identified with only a descriptive name (i.e., to the genus level), then it is assumed that the organisms are the same. The speciated organism should be reported as the infecting pathogen (see examples below).
  - b. If common skin contaminant organisms from the cultures are speciated but no antibiograms are done or they are done for only one of the isolates, it is assumed that the organisms are the same.
  - c. If the common skin contaminants from the cultures have antibiograms that are different for two or more antimicrobial agents, it is assumed that the organisms are not the same (see table below).
  - d. For the purpose of NHSN antibiogram reporting, the category interpretation of intermediate (I) should not be used to distinguish whether two organisms are different.

Culture	Companion Culture	Report as...
<i>S. epidermidis</i>	Coagulase-negative staphylococci	<i>S. epidermidis</i>
<i>Bacillus</i> spp. (not anthracis)	<i>B. cereus</i>	<i>B. cereus</i>
<i>S. salivarius</i>	<i>Strep viridans</i>	<i>S. salivarius</i>

Organism Name	Isolate A	Isolate B	Interpret as...
<i>S. epidermidis</i>	All drugs S	All drugs S	Same
<i>S. epidermidis</i>	OX R CEFAZ R	OX S CEFAZ S	Different
<i>Corynebacterium</i> spp.	PENG R CIPRO S	PENG S CIPRO R	Different
<i>Strep viridans</i>	All drugs S	All drugs S except ERYTH (R)	Same

5. For patients  $\leq 1$  year of age, the following temperature equivalents for fever and hypothermia may be used: Fever: 38°C rectal/tympanic/temporal artery = 37°C oral = 36°C axillary Hypothermia: 37°C rectal/tympanic/temporal artery = 36°C oral = 35°C axillary.

### **Other definitions**

**Acute Care Hospitals** – all facilities designated as acute care by the Massachusetts Department of Public Health.

**Central Venous Catheters<sup>P</sup>** – An intravascular catheter that terminates at or close to the heart or in one of the great vessels which is used for infusion, withdrawal of blood, or hemodynamic monitoring. The following are considered great vessels for the purpose of reporting central-line infections and counting central-line days in the NHSN system: aorta, pulmonary artery, superior vena cava, inferior vena cava, brachiocephalic veins, internal jugular veins, subclavian veins, external iliac veins, and common femoral veins.

- NOTE: An introducer is considered an intravascular catheter
- NOTE: In neonates, the umbilical artery/vein is considered a great vessel.
- NOTE: Neither the location of the insertion site nor the type of device may be used to determine if a line qualifies as a central line. The device must terminate in one of these vessels or in or near the heart to qualify as a central line.
- NOTE: Pacemaker wires and other nonlumenated devices inserted into central blood vessels or the heart are not considered central lines, because fluids are not infused, pushed, nor withdrawn through such devices.

*Clarification for Massachusetts reporting: CV catheters include peripherally inserted central catheters (PICC) and temporary dialysis catheters inserted in the ICU*

**Catheter-days** – total number of days of exposure to the central venous catheter by all of the patients in the observed ICU. The count could be performed each day, or a once-weekly sampling methodology may be done. A patient with more than one (1) CV catheter on a given day is counted only once for that day.

**Catheter-day sampling methodology**-Definitions above apply here, except counts may be performed one day per week. The count determined by this method is applied to each of the following six days. Sampling should be limited to hospitals with more than 100 beds.<sup>30</sup>

**Intensive Care Units (ICUs)** – include medical ICUs (MICU), surgical ICUs (SICU), combined medical/surgical ICUs, neonatal ICUs (NICU), pediatric ICUs (PICU), coronary care units (CCU), neuro/neurosurgery ICUs (NSICU) cardiac surgery ICUs (CSICU), trauma ICUs, and burn ICUs

---

<sup>P</sup> to be updated based on the NHSN definition updates

## **ATTACHMENT D**

### **Definition of Surgical Site Infections (SSI):<sup>q</sup>**

A **superficial incisional SSI** must meet the following criteria:

Infection occurs within 30 days after the operative procedure

**and**

involves only skin and subcutaneous tissue of the incision

**and**

patient has at least one of the following:

- a. purulent drainage from the superficial incision.
- b. organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision.
- c. at least one of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness, or heat, and superficial incision is deliberately opened by surgeon, and is culture-positive or not cultured. A culture-negative finding does not meet this criterion.
- d. diagnosis of superficial incisional SSI by the surgeon or attending physician.

NOTE: There are two specific types of superficial surgical incisional SSIs:

1. Superficial Incisional Primary (SIP) – a superficial incisional SSI that is identified in the primary incision in a patient that has had an operation with one or more incisions (e.g., C-section incision or chest incision for CBGB)
2. Superficial Incisional Secondary (SIS) – a superficial incisional SSI that is identified in the secondary incision in a patient that has had an operation with more than one incision (e.g., donor site [leg] incision for CBGB)

A **deep incisional SSI** must meet the following criteria:

Infection occurs within 30 days after the operative procedure if no implant is left in place or within one year if implant is in place and the infection appears to be related to the operative procedure

**and**

involves deep soft tissues (e.g., fascial and muscle layers) of the incision

**and**

patient has at least one of the following:

- a. purulent drainage from the deep incision but not from the organ/space component of the surgical site
- b. a deep incision spontaneously dehisces or is deliberately opened by a surgeon and is culture-positive or not cultured when the patient has at least one of the following signs or symptoms: fever ( $>38^{\circ}\text{C}$ ), or localized pain or tenderness. A culture-negative finding does not meet this criterion.
- c. an abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathologic or radiologic examination
- d. diagnosis of a deep incisional SSI by a surgeon or attending physician.

NOTE: There are two specific types of deep surgical incisional SSIs:

1. Deep Incisional Primary (DIP) – a deep incisional SSI that is identified in a primary incision in a patient that has had an operation with one or more incisions (e.g., C-section incision or chest incision for CBGB)
2. Deep Incisional Secondary (DIS) – a deep incisional SSI that is identified in the secondary incision in a patient that has had an operation with more than one incision (e.g., donor site [leg] incision for CBGB)

---

<sup>q</sup> Source: NHSN Patient Safety Protocol, May 24, 2007

An **organ/space SSI** involves any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure. Specific sites are assigned to organ/space SSI to further identify the location of the infection. Individual definitions are available from the NHSN.

An **organ/space SSI** must meet the following criteria:

Infection occurs within 30 days after the operative procedure if no implant is left in place or within one year if implant is in place and the infection appears to be related to the operative procedure

**and**

infection involves any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure

**and**

patient has at least one of the following:

- a. purulent drainage from a drain that is placed through a stab wound into the organ/space
- b. organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space
- c. an abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination
- d. diagnosis of an organ/space SSI by a surgeon or attending physician.

#### **Other definitions:**

**Operative procedure** is a procedure 1) that is performed on a patient who is an inpatient; and 2) takes place during an operation (defined as a single trip to the operating room [OR] where a surgeon makes at least one incision through the skin or mucous membrane, including laparoscopic approach, and closes the incision before the patient leaves the OR.

**Inpatient:** A patient whose date of admission to the healthcare facility and the date of discharge are different calendar days.

**Implant:** A nonhuman-derived implantable foreign body (e.g., prosthetic heart valve, nonhuman vascular graft, mechanical heart, or hip prosthesis) that is permanently placed in a patient during an NHSN operative procedure and is not routinely manipulated for diagnostic or therapeutic purposes. Screws, wires, and mesh that are left permanently are considered implants.

## ATTACHMENT E

### Summary Chart of HAI-Related Measures as recommended by the Massachusetts Expert Panel, January 31<sup>th</sup> 2008

HAI Measures Approved by Expert Panel			
Outcome Measures	Reporting Level		
	Public <sup>1</sup>	BLC <sup>2</sup>	Internal <sup>3</sup>
✓ CVC-BSI in ICUs – true pathogens (CDC criterion 1)*	♦		
✓ CVC-BSI in ICUs – skin contaminants (CDC criterion 2 and 3)*		♦	
✓ CVC-BSI outside of ICUs – true pathogens and skin contaminants (CDC criteria 1 and 2)*			♦
✓ SSI resulting from hip arthroplasty	♦		
✓ SSI resulting from knee arthroplasty	♦		
✓ SSI resulting from hysterectomy (vaginal and abdominal)		♦	
✓ SSI resulting from coronary artery bypass graft		♦	
✓ Ventilator-Associated Pneumonia (VAP)			♦
Point prevalence of methicillin-resistant <i>Staphylococcus aureus</i> (MRSA)		♦	
<i>Clostridium difficile</i> -associated disease (CDAD)			♦
<b>Process Measures</b>			
VAP prevention: Daily application of protocol-driven assessments for readiness to discontinue mechanical ventilation		♦	
VAP prevention: Elevation of the head of the patient's bed		♦	
✓ Influenza vaccination of healthcare workers (new to NHSN for 2008)		♦	

✓ = Measure found in National Healthcare Safety Network (NHSN)

<sup>1</sup> Public – Data submitted to the Department of Public Health

<sup>2</sup> BLC – Betsy Leman Center for Patient Safety and Medical Error Reduction

<sup>3</sup> Internal – For reporting hospital's own use only

CVC-BSI – central-venous catheter-associated bloodstream infection

ICU – intensive care unit

SSI – surgical site infection

\* please see [Attachment C](#) in *Recommendations Related to Reporting of Healthcare-Associated Infection Measures*

## References:

1. Association of Professionals in Infection Control. (2005). APIC position on mandatory public reporting of healthcare associated infections. [APIC Web site]. Mar 14. Available from: [http://www.apic.org/AM/Template.cfm?Section=Position\\_Papers1&Template=/CM/ContentDisplay.cfm&ContentFileID=2240](http://www.apic.org/AM/Template.cfm?Section=Position_Papers1&Template=/CM/ContentDisplay.cfm&ContentFileID=2240)
2. Healthcare-Associated Infection Working Group of the Joint Public Policy Committee. (2007). Essentials of Public Reporting of Healthcare-Associated Infections: A Tool Kit. [Internet] Available from: [http://www.shea-online.org/Assets/files/Essentials\\_of\\_Public\\_Reporting\\_Tool\\_Kit.pdf](http://www.shea-online.org/Assets/files/Essentials_of_Public_Reporting_Tool_Kit.pdf)
3. Massachusetts Hospital Association. (2007). Expectations for measuring, reporting and improving the quality and safety of hospital and health care.
4. McKibben L, Horan T, et al. (2005). Guidance on public reporting of healthcare associated infections: Recommendations of the Healthcare Infection Control Practices Advisory Committee. *AJIC* 33: 217-226.
5. Scheckler WE, Brimhall D, Buck AS. (1998). Requirements for infrastructure and essential activities of infection control and epidemiology in hospitals: a consensus panel report. *ICHE* 19: 114-124.
6. Werner RM, Asch DA. (2005). The unintended consequences of publicly reporting quality information. *JAMA* 293: 1239-1244.
7. Aronsky D, Haug PJ, Lagor C, Dean NC. (2005). Accuracy of administrative data for identifying patients with pneumonia. *Am J Med Qual* Nov-Dec;20(6):319-28.
8. Julian KG, Brumbach AM, et al. (2006). First year of mandatory reporting of healthcare-associated infections, Pennsylvania: an infection control-chart abstractor collaboration. *Infect Control Hosp Epidemiol* 27:926-30.
9. McKibben L, Fowler G, et al. (2006). Ensuring rational public reporting systems for health care-associated infections: systematic literature review and evaluation recommendations. *Am J Infect Control* 34:142-9.
10. Romano PS, Chan BK, Schembri ME, Rainwater JA. (2002). Can administrative data be used to compare postoperative complication rates across hospitals? *Med Care* Oct;40(10):856-67.
11. Sherman ER, Heydon KH, et al. (2006). Administrative data fail to accurately identify cases of healthcare-associated infection. *Infect Control Hosp Epidemiol* 27:4 332-7.
12. Stone PW, Horan T, Shih H, Mooney-Kane C, Larson EL. (2007). Comparisons of health care-associated infections identification using 2 mechanisms for public reporting. *Am J Infect Control* 35:145-9.
13. Association for Professionals in Infection Control and Epidemiology. (1998). Release of nosocomial infection data [Position Paper]. *APIC News* 17(2):1-5.
14. Garrouste-Orgeas M, Chevret S, et al. (2000). A one-year prospective study of nosocomial bacteraemia in ICU and non-ICU patients and its impact on patient outcome. *J Hosp Infect.* Mar;44(3):206-13.
15. Jarvis WR. (2003). Benchmarking for prevention: the Centers for Disease Control and Prevention's National Nosocomial Infections Surveillance (NNIS) system experience. *Infection* Dec;31 Suppl 2:44-8.

16. Healthcare-Associated Infection Working Group of the Joint Public Policy Committee. V.S
17. Klevens RM, Edwards JR, et al. (2007). Estimating health care-associated infections and deaths in U.S. hospitals, 2002. *Public Health Rep* Mar-Apr;122(2):160-6.
18. McKibben L, Horan T, et al. V.S.
19. Yokoe DS, Anderson J, et al. (1998). Simplified surveillance for nosocomial bloodstream infections. *Infect Control Hosp Epidemiol* Sep;19(9):657-60.
20. Brandt C, Hansen S, et al. (2004). Finding a method for optimizing risk adjustment when comparing surgical-site infection rates. *Infect Control Hosp Epidemiol* Apr;25(4):313-8.
21. Huotari K, Lyytikainen O; et al. (2006). Impact of postdischarge surveillance on the rate of surgical site infection after orthopedic surgery. *Infect Control Hosp Epidemiol* Dec;27(12):1324-9. Epub 2006 Nov 21.
22. Klevens RM. V.S.
23. McKibben L, Horan T, et al. V.S.
24. Sands K, Vineyard G, Livingston J, Christiansen C, Platt R. (1999). Efficient identification of postdischarge surgical site infections: use of automated pharmacy dispensing information, administrative data, and medical record information. *J Infect Dis* Feb;179(2):434-41.
25. Sands K, Vineyard G, Platt R. (1996). Surgical site infections occurring after hospital discharge. *J Infect Dis* Apr;173(4):963-70.
26. Beekmann SE, Diekema DJ, Doern GV. (2005). Determining the clinical significance of coagulase-negative staphylococci isolated from blood cultures. *Infect Control Hosp Epidemiol* Jun;26(6):559-66.
27. Favre B, Hugonnet S, et al. (2005). Nosocomial bacteremia: clinical significance of a single blood culture positive for coagulase-negative staphylococci. *Infect Control Hosp Epidemiol* Aug;26(8):697-702.
28. Khatib R, Riederer KM, et al. (1995). Coagulase-negative staphylococci in multiple blood cultures: strain relatedness and determinants of same-strain bacteremia. *J Clin Microbiol* Apr;33(4):816-20.
29. Kim SD, McDonald LC, et al. (2000). Determining the significance of coagulase-negative staphylococci isolated from blood cultures at a community hospital: a role for species and strain identification *Infect Control Hosp Epidemiol* 21:213-7.
30. Klevens RM, Tokars JI, et al; NNIS. (2006). Sampling for collection of central line-day denominators in surveillance of healthcare-associated bloodstream infections. *Infect Control Hosp Epidemiol* Apr;27(4):338-42.
31. Seo SK, Venkataraman L, et al. (2000). Molecular typing of coagulase-negative staphylococci from blood cultures does not correlate with clinical criteria for true bacteremia. *Am J Med* Dec 15;109(9):697-704.
32. Trick WE, Zagorski BM, et al. (2004). Computer algorithms to detect bloodstream infections. *Emerg Infect Dis* Sep;10(9):1612-20.
33. Yokoe DS, Anderson J, et al. V.S.

34. Grap MJ, Munro CL, et al. (2005). Effect of backrest elevation on the development of ventilator-associated pneumonia. *Am J Crit Care* Jul;14(4):325-32; quiz 333.
35. Kollef MH, Levy NT, et al. (1998). The use of continuous i.v. sedation is associated with prolongation of mechanical ventilation. *Chest* Aug;114(2):541-8.
36. Kress JP, Pohlman AS, O'Connor MF, Hall JB. (2000). Daily interruption of sedative infusions in critically ill patients undergoing mechanical ventilation. *N Engl J Med* 342:1471-1477.
37. Schweickert WD, Gehlbach BK, Pohlman AS, Hall JB, Kress JP. (2004). Daily interruption of sedative infusions and complications of critical illness in mechanically ventilated patients. *Crit Care Med* Jun;32(6):1272-6.
38. van Nieuwenhoven CA, Vandenbroucke-Grauls C, et al. (2006). Feasibility and effects of the semirecumbent position to prevent ventilator-associated pneumonia: a randomized study. *Crit Care Med* Feb;34(2):396-402.
39. Jarvis, W. R., J. Schlosser, et al. (2007). National prevalence of methicillin-resistant *Staphylococcus aureus* in inpatients at US health care facilities, 2006. *Am J Infect Control* 35(10): 631-7.
40. Merrer, J., F. Santoli, et al. (2000). "Colonization pressure" and risk of acquisition of methicillin-resistant *Staphylococcus aureus* in a medical intensive care unit." *Infect Control Hosp Epidemiol* 21(11): 718-23.
41. Siegel, J. D., E. Rhinehart, et al. (2007). Management of multidrug-resistant organisms in health care settings, 2006. *Am J Infect Control* 35(10 Suppl 2): S165-93.
42. Diekema, D. J. and M. B. Edmond (2007). Look before you leap: active surveillance for multidrug-resistant organisms. *Clin Infect Dis* 44(8): 1101-7.
43. Guide to the Elimination of Methicillin-Resistant *Staphylococcus aureus* (MRSA) Transmission in Hospital Settings, An APIC Guide, March 2007.
44. Procedures for obtaining MRSA screening cultures for infants and children will be added by the HAI Technical Advisory Group.
45. Pearson, M. L., C. B. Bridges, et al. (2006). Influenza vaccination of health-care personnel: recommendations of the Healthcare Infection Control Practices Advisory Committee (HICPAC) and the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* 55(RR-2): 1-16.
46. Dash, G. P., L. Fauerbach, et al. (2004). APIC position paper: Improving health care worker influenza immunization rates. *Am J Infect Control* 32(3): 123-5.
47. Talbot, T. R., S. E. Bradley, et al. (2005). Influenza vaccination of healthcare workers and vaccine allocation for healthcare workers during vaccine shortages. *Infect Control Hosp Epidemiol* 26(11): 882-90.
48. Improving Influenza Vaccination Rates in Health Care Workers. Strategies for Increase Protection for Workers and Patients. (2004) National Foundation for Infectious Diseases. [Internet] Available from: <http://www.nfid.org/pdf/publications/hcwmonograph.pdf>
49. McKibben, L., T. C. Horan, et al. (2005). Guidance on public reporting of healthcare-associated infections: recommendations of the Healthcare Infection Control Practices Advisory Committee. *Infect Control Hosp Epidemiol* 26(6): 580-7.

50. The Healthcare-Associated Infection Working Group of the Joint Public Policy Committee. (2007). Essentials of Public Reporting of Healthcare-Associated Infections: A Took Kit. [Internet] Available from: [http://www.shea-online.org/Assets/files/Essentials\\_of\\_Public\\_Reporting\\_Tool\\_Kit.pdf](http://www.shea-online.org/Assets/files/Essentials_of_Public_Reporting_Tool_Kit.pdf)
51. The Joint Commission. (2007). New Standard IC.4.15. Surveillance, Prevention, and Control of Infection. Effective 1/1/07 <http://www.jcrinc.com/26813/newsletters/12862/?query=influenza>
52. Russell, M. L. and E. A. Henderson (2003). The measurement of influenza vaccine coverage among health care workers. *Am J Infect Control* 31(8): 457-61.
53. Russell, M. L., W. E. Thurston, et al. (2003). Theory and models for planning and evaluating institutional influenza prevention and control programs. *Am J Infect Control* 31(6): 336-41.
54. Bertin, M., M. Scarpelli, et al. (2007). Novel use of the intranet to document health care personnel participation in a mandatory influenza vaccination reporting program. *Am J Infect Control* 35(1): 33-7.
55. Lugo, N. R. (2007). Will carrots or sticks raise influenza immunization rates of health care personnel? *Am J Infect Control* 35(1): 1-6.
56. Walker, F. J., J. A. Singleton, et al. (2006). Influenza vaccination of healthcare workers in the United States, 1989-2002. *Infect Control Hosp Epidemiol* 27(3): 257-65.
57. Poland, G. A., P. Tosh, et al. (2005). Requiring influenza vaccination for health care workers: seven truths we must accept. *Vaccine* 23(17-18): 2251-5.
58. Climo M, Diekema D, et al. (2003). Prevalence of the use of central venous access devices within and outside of the intensive care unit: results of a survey among hospitals in the prevention epicenter program of the Centers for Disease Control and Prevention. *Infect Control Hosp Epidemiol* Dec;24(12):942-5.
59. Kleven RM, Tokars JJ, et al. V.S.
60. Maki DG, Kluger DM, Crnich CJ. (2006). The risk of bloodstream infection in adults with different intravascular devices: a systematic review of 200 published prospective studies. *Mayo Clin Proc* Sep;81(9):1159-71.
61. Trick WE, Vernon MO, et al. (2004). Unnecessary use of central venous catheters: the need to look outside the intensive care unit. *Infect Control Hosp Epidemiol* Mar;25(3):266-8.
62. Safdar N, Maki DG. (2005). Risk of catheter-related bloodstream infection with peripherally inserted central venous catheters used in hospitalized patients. *Chest* Aug;128(2):489-95.
63. Suljagic V, Cobeljic M, et al. (2005). Nosocomial bloodstream infections in ICU and non-ICU patients. *Am J Infect Control* Aug;33(6):333-40.
64. Senger SS, Saccozza ME, et al. (2007). Compatibility of Pulsed-Field Gel Electrophoresis Findings and Clinical Criteria Commonly Used to Distinguish Between True Coagulase-Negative Staphylococcal Bacteremia and Contamination. *Infect Control Hosp Epidemiol* Jul; 28: 992–996.
65. Marshall, J. (2007). Catheter-Associated Bloodstream Infections in General Medical Patients Outside the Intensive Care Unit: A Surveillance Study. *Infect Control Hosp Epidemiol* Jul; 28:905–909.
66. Klompas M. (2007). Does this patient have ventilator-associated pneumonia? *JAMA* Apr 11;297(14):1583-93.
67. McKibben L, Horan T, et al. V.S.

68. Petersen IS, Aru A, et al. (1999). Evaluation of pneumonia diagnosis in intensive care patients. *Scand J Infect Dis* 31(3):299-303.
69. Marquette CH, Copin MC, et al. (1995). Diagnostic tests for pneumonia in ventilated patients: prospective evaluation of diagnostic accuracy using histology as a diagnostic gold standard. *Am J Respir Crit Care Med* Jun;151(6):1878-88.
70. Joint Commission on the Accreditation of Healthcare Organizations. (1994). Accreditation manual for hospitals. In: Joint Commission on the Accreditation of Healthcare Organizations, ed. Chicago, IL: Joint Commission on the Accreditation of Healthcare Organizations 121–140
71. McDonald, L. C., B. Coignard, et al. (2007). Recommendations for surveillance of *Clostridium difficile*-associated disease. *Infect Control Hosp Epidemiol* 28(2):140-5.